

From The Differentiated Classroom: Responding to
the Needs of all Learners. Carol Ann Tomlinson
ASCD. 1999

2

Elements of Differentiation

The biggest mistake of past centuries in teaching has been to treat all children as if they were variants of the same individual, and thus to feel justified in teaching them the same subjects in the same ways.

Howard Gardner (in Siegel & Shaughnessy, 1994)

Phi Delta Kappan

Most effective teachers modify some of their instruction for students some of the time. Many of those teachers also believe they differentiate instruction, and, to some degree, they do. It is not this book's goal, however, to recount the sorts of modifications sensitive teachers make from time to time, such as offering a student extra help during lunch or asking an especially able learner a challenging question during a review session. This book offers guidance for educators who want to develop and facilitate consistent, robust plans in anticipation of and in response to students' learning differences.

Principles That Guide Differentiated Classrooms

There is no single formula for creating a differentiated classroom. What follows are a few of the

key ideas about differentiation. As you read and consider them, you might want to think about your own classroom, or refer to Chapter 1 and the illustrations of differentiated classrooms to see how the principles look in action.

The Teacher Focuses on the Essentials

No one can learn everything in every textbook, let alone in a single subject. The brain is structured so that even the most able of us will forget more than we remember about most topics. It is crucial, then, for teachers to articulate what's essential for learners to recall, understand, and be able to do in a given domain.

In a differentiated classroom, the teacher carefully fashions instruction around the essential concepts, principles, and skills of each subject. She intends that students will leave the class with a

firm grasp of those principles and skills, but they won't leave with a sense that they have conquered all there is to know. The teacher's clarity ensures that struggling learners focus on essential understandings and skills; they don't drown in a pool of disjointed facts. Similarly, the teacher ensures that advanced learners spend their time grappling with important complexities rather than repeating work on what they already know. Clarity increases the likelihood that a teacher can introduce a subject in a way that each student finds meaningful and interesting. Clarity also ensures that teacher, learners, assessment, curriculum, and instruction are linked tightly in a journey likely to culminate in personal growth and individual success for each child.

The Teacher Attends to Student Differences

From a very young age, children understand that some of us are good with kicking a ball, some with telling funny stories, some with manipulating numbers, and some with making people feel happy. They understand that some of us struggle with reading words from a page, others with keeping tempers in check, still others with arms or legs that are weak. Children seem to accept a world in which we are not alike. They do not quest for sameness, but they search for the sense of triumph that comes when they are respected, valued, nurtured, and even cajoled into accomplishing things they believed beyond their grasp.

In differentiated classrooms, the teacher is well aware that human beings share the same basic needs for nourishment, shelter, safety, belonging, achievement, contribution, and fulfillment. She also knows that human beings find those things in different fields of endeavor, according to different

timetables, and through different paths. She understands that by attending to human differences she can best help individuals address their common needs. Our experiences, culture, gender, genetic codes, and neurological wiring all affect how and what we learn. In a differentiated classroom, the teacher unconditionally accepts students as they are, and she expects them to become all they can be.

Assessment and Instruction Are Inseparable

In a differentiated classroom, assessment is ongoing and diagnostic. Its goal is to provide teachers day-to-day data on students' readiness for particular ideas and skills, their interests, and their learning profiles. These teachers don't see assessment as something that comes at the end of a unit to find out what students learned; rather, assessment is today's means of understanding how to modify tomorrow's instruction.

Such formative assessment may come from small-group discussion with the teacher and a few students, whole-class discussion, journal entries, portfolio entries, exit cards, skill inventories, pretests, homework assignments, student opinion, or interest surveys. At this stage, assessment yields an emerging picture of who understands key ideas and who can perform targeted skills, at what levels of proficiency, and with what degree of interest. The teacher then shapes tomorrow's lesson—and even today's—with the goal of helping individual students move ahead from their current position of competency.

At benchmark points in learning, such as the end of a chapter or unit, teachers in differentiated classrooms use assessment to formally record student growth. Even then, however, they seek varied

means of assessment so that all students can fully display their skills and understandings. Assessment always has more to do with helping students grow than with cataloging their mistakes.

The Teacher Modifies Content, Process, and Products

By thoughtfully using assessment data, the teacher can modify content, process, or product. *Content* is what she wants students to learn and the materials or mechanisms through which that is accomplished. *Process* describes activities designed to ensure that students use key skills to make sense out of essential ideas and information. *Products* are vehicles through which students demonstrate and extend what they have learned.

Students vary in readiness, interest, and learning profile. *Readiness* is a student's entry point relative to a particular understanding or skill. Students with less-developed readiness may need

- someone to help them identify and make up gaps in their learning so they can move ahead;
- more opportunities for direct instruction or practice;
- activities or products that are more structured or more concrete, with fewer steps, closer to their own experiences, and calling on simpler reading skills; or
- a more deliberate pace of learning.

Advanced students, on the other hand, may need

- to skip practice with previously mastered skills and understandings;
- activities and products that are quite complex, open-ended, abstract, and multifaceted, drawing on advanced reading materials; or
- a brisk pace of work, or perhaps a slower pace to allow for greater depth of exploration of a topic.

Interest refers to a child's affinity, curiosity, or passion for a particular topic or skill. One student may be eager to learn about fractions because she is very interested in music, and her math teacher shows her how fractions relate to music. Another child may find a study of the American Revolution fascinating because he is particularly interested in medicine and has been given the option of creating a final product on medicine during that period.

Learning profile has to do with how we learn. It may be shaped by intelligence preferences, gender, culture, or learning style. Some students need to talk ideas over with peers to learn them well. Others work better alone and with writing. Some students learn easily part-to-whole. Others need to see the big picture before specific parts make sense. Some students prefer logical or analytical approaches to learning. Other classmates prefer creative, application-oriented lessons. (See the Appendix and the end of this chapter for sources to learn more about readiness, interest, and learning profile.)

Teachers may adapt one or more of the curricular elements (content, process, products) based on one or more of the student characteristics (readiness, interest, learning profile) at any point in a lesson or unit. However, you need not differentiate all elements in all possible ways. Effective differentiated classrooms include many times in which whole-class, nondifferentiated fare is the order of the day. Modify a curricular element only when (1) you see a student need and (2) you are convinced that modification increases the likelihood that the learner will understand important ideas and use important skills more thoroughly as a result.

All Students Participate in Respectful Work

In differentiated classrooms, certain essential understandings and skills are goals for all learners. However, some students need repeated experiences to master them, and other students master them swiftly. The teacher in a differentiated classroom understands that she does not show respect for students by ignoring their learning differences. She continually tries to understand what individual students need to learn most effectively, and she attempts to provide learning options that are a good fit for each learner whenever she can. She shows respect for learners by honoring both their commonalities and differences, not by treating them alike.

For example, some students grasp an idea best when they see it directly tethered to their own lives and experiences. Others can think about the idea more conceptually. Some students strive for accuracy and eschew the uncertainty of creativity. Others thirst for the adventure of divergence and deplore the tedium of drill. Some students want to sing their understanding of a story, some want to dance the story's theme, some want to draw it, and some want to write to the author or a character.

In the end, it is not standardization that makes a classroom work. It is a deep respect for the identity of the individual. A teacher in a differentiated classroom embraces at least the following four beliefs.

- Respect the readiness level of each student.
- Expect all students to grow, and support their continual growth.
- Offer all students the opportunity to explore essential understandings and skills at degrees of difficulty that escalate consistently as they develop their understanding and skill.
- Offer all students tasks that look—and

are—equally interesting, equally important, and equally engaging.

The Teacher and Students Collaborate in Learning

Teachers are the chief architects of learning, but students should assist with the design and building. It is the teacher's job to know what constitutes essential learning, to diagnose, to prescribe, to vary the instructional approach based on a variety of purposes, to ensure smooth functioning of the classroom, and to see that time is used wisely. Nonetheless, students have much to contribute about their understanding.

Students can provide diagnostic information, develop classroom rules, participate in the governing process grounded in those rules, and learn to use time as a valuable resource. Students can let teachers know when materials or tasks are too hard or too easy, when learning is interesting (and when it isn't), when they need help, and when they are ready to work alone. When they are partners in shaping all parts of the classroom experience, students develop ownership in their learning and become more skilled at understanding themselves and making choices that enhance their learning.

In a differentiated classroom, the teacher is the leader, but like all effective leaders, she attends closely to her followers and involves them thoroughly in the journey. Together, teacher and students plan, set goals, monitor progress, analyze successes and failures, and seek to multiply the successes and learn from failures. Some decisions apply to the class as a whole. Others are specific to an individual.

A differentiated classroom is, of necessity, student-centered. Students are the workers. The

teacher coordinates time, space, materials, and activities. Her effectiveness increases as students become more skilled at helping one another and themselves achieve group and individual goals.

The Teacher Balances Group and Individual Norms

In many classrooms, a student is an “unsuccessful” 5th grader if he falls short of 5th grade “standards.” That the student grew more than anyone in the room counts for little if he still lags behind grade-level expectations. Similarly, a child is expected to remain in 5th grade even though she achieved those standards two years ago. About that student we often say, “She’s fine on her own. She’s already doing well.”

Teachers in a differentiated classroom understand group norms. They also understand individual norms. When a student struggles as a learner, the teacher has two goals. One is to accelerate the student’s skills and understanding as rapidly as possible for that learner, still ensuring genuine understanding and meaningful application of skills. The second is to ensure that the student and parents are aware of the learner’s individual goals and growth and the student’s relative standing in the class. The same is true when a learner has advanced beyond grade-level expectations.

A great coach never achieves greatness for himself or his team by working to make all his players alike. To be great, and to make his players great, he must make each player the best that he or she possibly can be. No weakness in understanding or skill is overlooked. Every player plays from his or her competencies, not from a sense of deficiency. There is no such thing as “good enough” for any team member. In an effectively differentiated

classroom, assessment, instruction, feedback, and grading take into account both group and individual goals and norms.

The Teacher and Students Work Together Flexibly

As in an orchestra composed of individuals, varied ensemble groups, sections, and soloists, the differentiated classroom is built around individuals, various small groups, and the class as a whole. They all work to “learn and play the score,” albeit with varied instruments, solo parts, and roles in the whole.

To address the various learning needs that make up the whole, teachers and students work together in a variety of ways. They use materials flexibly and employ flexible pacing. Sometimes the entire class works together, but sometimes small groups are more effective. Sometimes everyone uses the same materials, but it is often effective to have many materials available. Sometimes everyone finishes a task at 12:15, but often some students finish a task while others need additional time for completion. Sometimes the teacher says who will work together. Sometimes students make the choice. When the teacher decides, she may do so based on similar readiness, interest, or learning profile needs. Sometimes she places students of differing readiness, interests, or learning profiles together. Sometimes assignment to tasks is random. Sometimes the teacher is the primary helper of students. Sometimes students are one another’s best source of help.

In a differentiated classroom, the teacher also draws on a wide range of instructional strategies that help her focus on individuals and small groups, not just the whole class. Sometimes she

finds learning contracts helpful in targeting instruction; at other times, independent investigations work well. The goal is to link learners with essential understandings and skills at appropriate levels of challenge and interest.

Two Organizers for Thinking About Differentiation

Figure 2.1 presents an organizer for thinking about differentiation, and it is a way of thinking about this book as well. In a differentiated classroom, a teacher makes consistent efforts to respond to students' learning needs. She is guided by general principles of facilitating a classroom in which attention to individuals is effective. Then she systematically modifies content, process, or product based on students' readiness for the particular topic, materials, or skills; personal interests; and learning profiles. To do so, she calls upon a range of instructional and management strategies.

The teacher does not try to differentiate everything for everyone every day. That's impossible, and it would destroy a sense of wholeness in the class. Instead, the teacher selects moments in the instructional sequence to differentiate, based on formal or informal assessment. She also selects a time in her teaching plans to differentiate by interest so that students can link what is being studied to something that is important to them. She often provides options that make it natural for some students to work alone and others together, for some to have a more hands-on approach to making sense of ideas and for others to arrive at learning in a visual way. Differentiation is an organized yet flexible way of proactively adjusting teaching and learning to meet kids where they are and help

them to achieve maximum growth as learners.

All classrooms are multifaceted. A differentiated classroom, however, differs in key ways when compared with traditional classrooms. Figure 2.2 (p. 16) suggests some ways in which the two approaches to teaching may vary. Feel free to add your own comparisons to the chart as you think about your own classroom and as you read through the rest of the book. Remember that there is much middle ground between an absolutely traditional classroom and an absolutely differentiated one (assuming either extreme could ever exist). For an interesting self-assessment, think of the two columns in the chart as continuums. Place an X on each continuum where you believe your teaching is now, and place an X on where you'd like it to be.

For More Information

To learn more about the concept of differentiating instruction through readiness, interest, and learning profile, see the Appendix and the following sources:

Kiernan, L. (producer) (1997). *Differentiating instruction: A video staff development set*. Alexandria, VA: ASCD.

Tomlinson, C. (1995). *How to differentiate instruction in mixed ability classrooms*. Alexandria, VA: ASCD.

Tomlinson, C. (1996). Good teaching for one and all: Does gifted education have an instructional identity? *Journal for the Education of the Gifted*, 20, 155-174.

Tomlinson, C. (1996). *Differentiating instruction for mixed-ability classrooms*. [An ASCD professional inquiry kit]. Alexandria, VA: ASCD.

Figure 2.1
Differentiation of Instruction

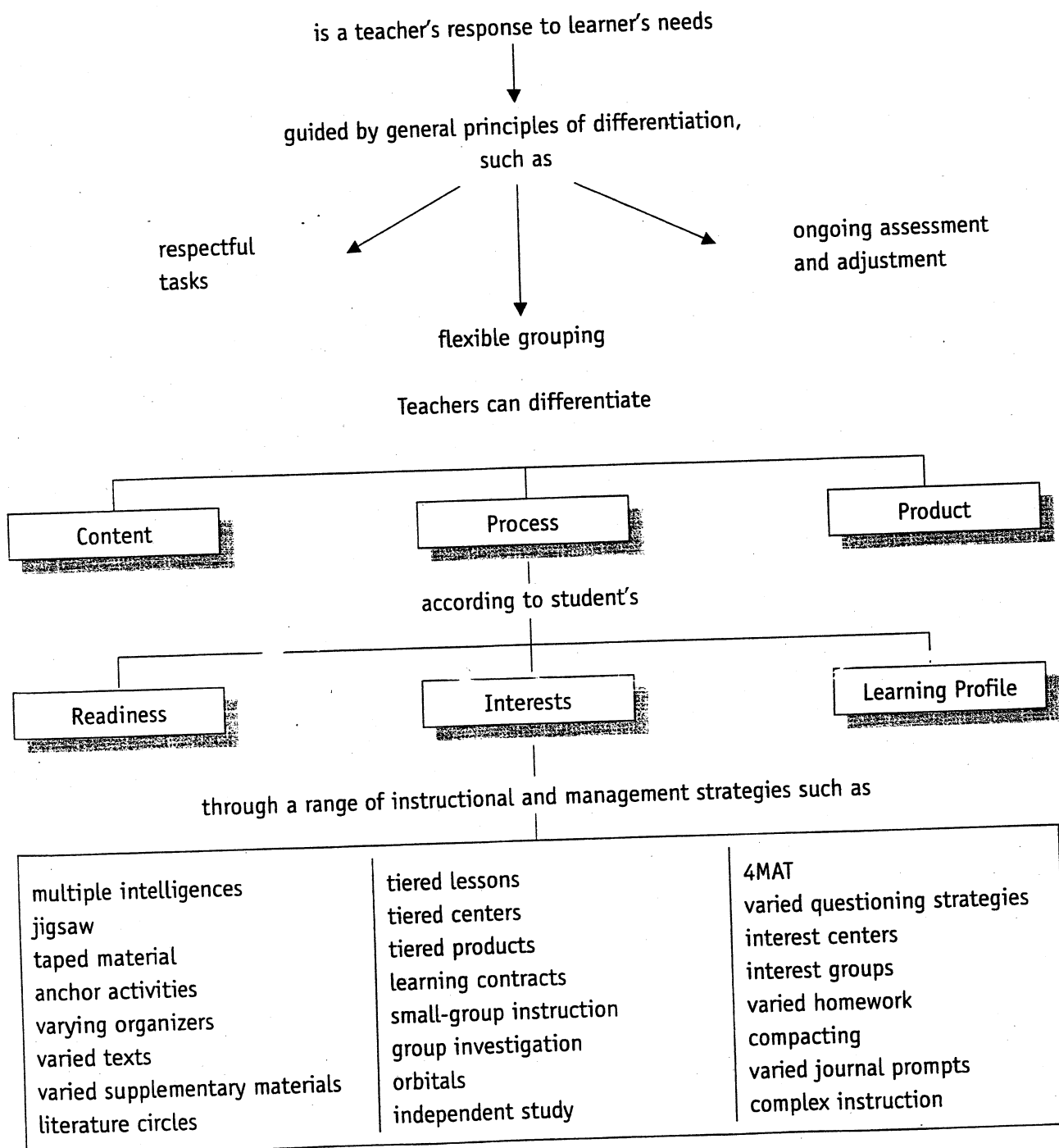


Figure 2.2
Comparing Classrooms

Traditional Classroom

- Student differences are masked or acted upon when problematic
- Assessment is most common at the end of learning to see "who got it"
- A relatively narrow sense of intelligence prevails
- A single definition of excellence exists
- Student interest is infrequently tapped
- Relatively few learning profile options are taken into account
- Whole-class instruction dominates
- Coverage of texts and curriculum guides drives instruction
- Mastery of facts and skills out-of-context are the focus of learning
- Single option assignments are the norm
- Time is relatively inflexible
- A single text prevails
- Single interpretations of ideas and events may be sought
- The teacher directs student behavior
- The teacher solves problems
- The teacher provides whole-class standards for grading
- A single form of assessment is often used

Differentiated Classroom

- Student differences are studied as a basis for planning
- Assessment is ongoing and diagnostic to understand how to make instruction more responsive to learner need
- Focus on multiple forms of intelligences is evident
- Excellence is defined in large measure by individual growth from a starting point
- Students are frequently guided in making interest-based learning choices
- Many learning profile options are provided for
- Many instructional arrangements are used
- Student readiness, interest, and learning profile shape instruction
- Use of essential skills to make sense of and understand key concepts and principles is the focus of learning
- Multi-option assignments are frequently used
- Time is used flexibly in accordance with student need
- Multiple materials are provided
- Multiple perspectives on ideas and events are routinely sought
- The teacher facilitates students' skills at becoming more self-reliant learners
- Students help other students and the teacher solve problems
- Students work with the teacher to establish both whole-class and individual learning goals
- Students are assessed in multiple ways

Good Instruction as a Basis for Differentiated Teaching

The Giver flicked his hand as if brushing something aside. "Oh, your instructors are well trained. They know their scientific facts. Everyone is well trained for his job.

It's just that . . . without the memories it's all meaningless."

"Why do you and I have to hold these memories?"
[the boy asked.]

"It gives us wisdom," the Giver replied.

Lois Lowry
The Giver

A young teacher tried her hand at developing her first differentiated lesson plan. "Could you give it a look and see if I'm on the right track?" she asked me.

Her 4th graders were all reading the same novel. She had fashioned five tasks, which she was going to assign to students based on what she perceived to be their readiness levels. The tasks were to

- create a new jacket for the book,
- build a set for a scene in the book,
- draw one of the characters,
- rewrite the novel's ending, or

• develop a conversation between a character in this novel and one from another novel they'd read in class that year.

After I looked at the tasks, I asked a question I wish someone had insisted I answer daily in the first decade of my teaching: "What do you want each student to come away with as a result of this activity?"

She squinted and answered, "I don't understand."

I tried again: "What common insight or understanding should all kids get because they

successfully complete their assigned task?"

She shook her head: "I still don't get it."

"Okay. Let me try another way." I paused. "Do you want each child to know that an author actually builds a character? Do you want them all to understand why the author took the time to write the book? Do you want them to think about how the main character's life is like their own? Just what is it that the activities should cause the students to make sense of?"

Her face flushed, and she waved her hand as if shooing away a bug. "Oh my gosh!" she exclaimed. "I thought all they were supposed to do was read the story and do something with it!"

"Hazy" Lessons

Many of us are like this novice. We entered the profession with a vague sense that students should read, listen to, or watch something. Then they should do "some sort of activity" based on it. Consider the following examples.

- A 1st grade teacher reads her children a story. Then she asks them to draw a picture of what they heard. But what should the picture portray? The story's beginning and end? How the main character looked when she was frightened by the stranger? The big tree in the barnyard?
- A 5th grade teacher talks with her students about black holes. Then she shows them a video about the topic. She asks them to write a story about black holes. To learn what? Why gravity acts as it does in black holes? To deal with issues of time? To demonstrate their understanding of the evolution of black holes?
- A 3rd grade teacher studies the Westward Movement with her students. Afterward, students build covered wagons. How does that help them

understand exploration, risk, scarcity of resources, or adaptation? Is the activity about pushing frontiers forward—or about manipulating glue and scissors?

In each example, the teacher had a hazy conception of what children should gain from their experience with content. Students did "something about the story," "something about black holes," "something about Westward Movement." The activities weren't deadlly dull or totally useless. Nonetheless, they present at least two problems. One is a barrier to high-quality teaching and learning. The other is a barrier to powerful differentiated instruction.

When a teacher lacks clarity about what a student should know, understand, and be able to do as a result of a lesson, the learning tasks she creates may or may not be engaging and we can almost be certain the tasks won't help students understand essential ideas or principles. A fuzzy sense of the essentials results in fuzzy activities, which, in turn, results in fuzzy student understanding. That's a barrier to high-quality teaching and learning.

This kind of situation also works against differentiated instruction. With many differentiated lessons, all students need to understand the same essential principles and even use the same key skills. Yet because of variance in student readiness, interest, or learning profile, children must "come at" the ideas and use the skills in different ways. If a teacher isn't clear about what all students should understand and be able to do when the learning experience ends, he or she lacks the vital organizer around which to develop a powerful lesson. That was the problem for the novice 4th grade teacher and her five "differentiated" activities. She just created five "somethings about the novel." The activities probably would result in five fuzzy

successfully complete their assigned task?"

She shook her head: "I still don't get it."

"Okay. Let me try another way." I paused. "Do you want each child to know that an author actually builds a character? Do you want them all to understand why the author took the time to write the book? Do you want them to think about how the main character's life is like their own? Just what is it that the activities should cause the students to make sense of?"

Her face flushed, and she waved her hand as if shooing away a bug. "Oh my gosh!" she exclaimed. "I thought all they were supposed to do was read the story and do something with it!"

"Hazy" Lessons

Many of us are like this novice. We entered the profession with a vague sense that students should read, listen to, or watch something. Then they should do "some sort of activity" based on it. Consider the following examples.

- A 1st grade teacher reads her children a story. Then she asks them to draw a picture of what they heard. But what should the picture portray? The story's beginning and end? How the main character looked when she was frightened by the stranger? The big tree in the barnyard?
- A 5th grade teacher talks with her students about black holes. Then she shows them a video about the topic. She asks them to write a story about black holes. To learn what? Why gravity acts as it does in black holes? To deal with issues of time? To demonstrate their understanding of the evolution of black holes?
- A 3rd grade teacher studies the Westward Movement with her students. Afterward, students build covered wagons. How does that help them

understand exploration, risk, scarcity of resources, or adaptation? Is the activity about pushing frontiers forward—or about manipulating glue and scissors?

In each example, the teacher had a hazy conception of what children should gain from their experience with content. Students did "something about the story," "something about black holes," "something about Westward Movement." The activities weren't deadly dull or totally useless. Nonetheless, they present at least two problems. One is a barrier to high-quality teaching and learning. The other is a barrier to powerful differentiated instruction.

When a teacher lacks clarity about what a student should know, understand, and be able to do as a result of a lesson, the learning tasks she creates may or may not be engaging and we can almost be certain the tasks won't help students understand essential ideas or principles. A fuzzy sense of the essentials results in fuzzy activities, which, in turn, results in fuzzy student understanding. That's a barrier to high-quality teaching and learning.

This kind of situation also works against differentiated instruction. With many differentiated lessons, all students need to understand the same essential principles and even use the same key skills. Yet because of variance in student readiness, interest, or learning profile, children must "come at" the ideas and use the skills in different ways. If a teacher isn't clear about what all students should understand and be able to do when the learning experience ends, he or she lacks the vital organizer around which to develop a powerful lesson. That was the problem for the novice 4th grade teacher and her five "differentiated" activities. She just created five "somethings about the novel." The activities probably would result in five fuzzy

understandings about the book—or no understanding at all.

Creating one version of an activity or product takes time. Creating two or three—and especially five!—is more labor intensive. It makes sense to ensure that you have a firm grasp of what makes a solid, powerful lesson before you create multiple versions of it. This chapter will help reduce the fuzziness that pervades much instruction. It also sets the stage for the many samples of differentiated instruction in the remainder of the book. Its goal is to help you fashion a sturdy foundation for differentiated instruction.

Two Essentials for Durable Learning

Over the years, I've been fascinated by students' savvy about what goes on in classrooms. I have had young adolescents say to me with diagnostic precision, "Her class is lots of fun. We don't learn a whole lot, but it's a fun class." Students understand the opposite situation, too: "We're learning math, I suppose, but it always seems like an awfully long class period."

These students voice an implicit understanding that two elements are required for a great class: engagement and understanding. Engagement happens when a lesson captures students' imaginations, snares their curiosity, ignites their opinions, or taps into their souls. Engagement is the magnet that attracts learners' meandering attention and holds it so that enduring learning can occur.

Understanding means much more than recalling. It means the learner has "wrapped around" an important idea, has incorporated it accurately into his or her inventory of how things work. The learner owns the idea.

A student who understands something can

- explain it clearly, giving examples;
- use it;
- compare and contrast it with other concepts;
- relate it to other instances in the subject studies, other subjects, and personal life experiences;
- transfer it to unfamiliar settings;
- discover the concept embedded within a novel problem;
- combine it appropriately with other understandings;
- pose new problems that exemplify or embody the concept;
- create analogies, models, metaphors, symbols, or pictures of the concept;
- pose and answer "what-if" questions that alter variables in a problematic situation;
- generate questions and hypotheses that lead to new knowledge and further inquiries;
- generalize from specifics to form a concept;
- use the knowledge to appropriately assess his or her own performance, or that of someone else (adapted from Barell, 1995).

Lessons that are not engaging let students' minds wander. They fail to make the case for relevance because students don't connect them to what's important in their lives. These kinds of lessons have little staying power. Thus, the learner has little long-term use for unengaging lessons.

Levels of Learning

Hilda Taba (in Schiever, 1991) understood before many others that learning has several dimensions. We can learn *facts*, or discrete bits of information that we believe to be true. We can develop *concepts*, or categories of things with common elements that help us organize, retain, and use information. We can understand *principles*,

which are the rules that govern concepts. We develop *attitudes*, or degrees of commitment to ideas and spheres of learning. And, if we are fortunate, we develop *skills*, which are the capacity to put to work the understandings we have gained.

Full, whole, and rich learning involves all these levels. Facts without concepts and principles to promote meaning are ephemeral. Meaning without skills needed to translate them into action lose their potency. Positive attitudes about the magic of learning are stillborn until we know, understand, and can take action in our world.

Joan Bauer, author of the young adult novel *Sticks* (Bauer, 1996), speaks of the need for children and adolescents to see connectedness in learning. They need to understand that the principles of science, math, history, and art are the same ones that we find in a pool hall, in our fears, and in the deep wellsprings of courage that make us taller than our nightmares (personal communication, 1997).

In *Sticks*, Bauer displays the skill of a master teacher orchestrating all the levels of learning. She writes of 10-year-old Mickey, who has a fire in his belly to win the 10- to 13-year-olds' nine-ball championship in his grandmother's pool hall. Mickey's father was a pool champ, but he died when Mickey was a baby.

Mickey's friend, Arlen, is as passionate about math as Mickey is about nine ball. Arlen hasn't memorized math. He thinks math. It is a way of life for him. Math, he explains, will never let you down in this world. Arlen knows what an angle is. He knows that a vector is "a line that takes you from one place to another" (Bauer, 1996, p. 37). These are *facts* Arlen has learned. Yet he understands the *concepts* of energy and motion and the *principles* that govern the concepts. "Every body

remains in a state of rest or uniform motion in a straight line, unless acted on by forces from the outside. In pool talk, this means a pool ball isn't going anywhere unless it's hit by something, and once it starts moving, it needs something to stop it, like a rail, another ball, or the friction of the cloth on the table" (Bauer, 1996, p. 177).

Because Arlen sees the utility of math, his *attitude* about math is that it's a language without which many things can't be properly explained. To him, the universe is written in the language of mathematics. What matters most about Arlen, however, is not what he has learned, and not even what he understands. What matters most is his *skill*. He uses pink yarn to teach Mickey about bank shots and geometric angles, about angles of incidence and angles of reflection. "When you hit the eight ball at a certain angle to the rail, it will bound off the rail at the same angle" (Bauer, 1996, p. 179). Arlen draws diagrams of pool shots so that Mickey sees the lines his balls will draw on the table, but Mickey comes to see much more.

Mickey reflects: "In school I keep seeing the table. Long shots. Short shots. Bank shots. Vectors. I'm seeing geometry everywhere—diamond shaped ball fields, birds flying in V formation. I have grapes for lunch and think about circles. Then I ram the grapes across my tray with my straw. Wham! Two grapes in the corner. It's all connected" (Bauer, 1996, p. 141).

Arlen knew some data. What gave him power, however, was not so much what he knew (facts), but what he understood (concepts and principles) and how he could parlay his understanding into action (skills) in a situation far removed from a schoolhouse worksheet.

All subjects are built upon essential concepts and principles. All subjects, by their nature, call

which are the rules that govern concepts. We develop *attitudes*, or degrees of commitment to ideas and spheres of learning. And, if we are fortunate, we develop *skills*, which are the capacity to put to work the understandings we have gained.

Full, whole, and rich learning involves all these levels. Facts without concepts and principles to promote meaning are ephemeral. Meaning without skills needed to translate them into action lose their potency. Positive attitudes about the magic of learning are stillborn until we know, understand, and can take action in our world.

Joan Bauer, author of the young adult novel *Sticks* (Bauer, 1996), speaks of the need for children and adolescents to see connectedness in learning. They need to understand that the principles of science, math, history, and art are the same ones that we find in a pool hall, in our fears, and in the deep wellsprings of courage that make us taller than our nightmares (personal communication, 1997).

In *Sticks*, Bauer displays the skill of a master teacher orchestrating all the levels of learning. She writes of 10-year-old Mickey, who has a fire in his belly to win the 10- to 13-year-olds' nine-ball championship in his grandmother's pool hall. Mickey's father was a pool champ, but he died when Mickey was a baby.

Mickey's friend, Arlen, is as passionate about math as Mickey is about nine ball. Arlen hasn't memorized math. He thinks math. It is a way of life for him. Math, he explains, will never let you down in this world. Arlen knows what an angle is. He knows that a vector is "a line that takes you from one place to another" (Bauer, 1996, p. 37). These are *facts* Arlen has learned. Yet he understands the *concepts* of energy and motion and the *principles* that govern the concepts. "Every body

remains in a state of rest or uniform motion in a straight line, unless acted on by forces from the outside. In pool talk, this means a pool ball isn't going anywhere unless it's hit by something, and once it starts moving, it needs something to stop it, like a rail, another ball, or the friction of the cloth on the table" (Bauer, 1996, p. 177).

Because Arlen sees the utility of math, his *attitude* about math is that it's a language without which many things can't be properly explained. To him, the universe is written in the language of mathematics. What matters most about Arlen, however, is not what he has learned, and not even what he understands. What matters most is his *skill*. He uses pink yarn to teach Mickey about bank shots and geometric angles, about angles of incidence and angles of reflection. "When you hit the eight ball at a certain angle to the rail, it will bound off the rail at the same angle" (Bauer, 1996, p. 179). Arlen draws diagrams of pool shots so that Mickey sees the lines his balls will draw on the table, but Mickey comes to see much more.

Mickey reflects: "In school I keep seeing the table. Long shots. Short shots. Bank shots. Vectors. I'm seeing geometry everywhere—diamond shaped ball fields, birds flying in V formation. I have grapes for lunch and think about circles. Then I ram the grapes across my tray with my straw. Wham! Two grapes in the corner. It's all connected" (Bauer, 1996, p. 141).

Arlen knew some data. What gave him power, however, was not so much what he knew (facts), but what he understood (concepts and principles) and how he could parlay his understanding into action (skills) in a situation far removed from a schoolhouse worksheet.

All subjects are built upon essential concepts and principles. All subjects, by their nature, call

for use of key skills, which professionals in that field use. Some concepts are generic and cut across subjects naturally and invite linkages. Examples of generic concepts are patterns, change, interdependence, perspective, part and whole, and systems. Those concepts work well in physical education, literature, science, computer science—virtually all areas of study. Other concepts are more subject specific: They are essential to one or more disciplines, but they are not as powerful in others. Examples of subject specific concepts are probability in math, composition in art, voice in literature, structure and function in science, and primary source in history.

Similarly, skills can be generic or subject specific. Generic skills include writing a cohesive paragraph, arranging ideas in order, and posing effective questions. Skills that are subject specific include balancing an equation in math, transposing in music, using metaphorical language in literature and writing, and synthesis of sources in history. Figure 5.1 illustrates the key levels of learning in several subject areas.

During planning, a teacher should generate specific lists of what students should know (facts), understand (concepts and principles), and be able to do (skills) by the time the unit ends. Then the teacher should create a core of engaging activities that offer varied opportunities for learning the essentials she has outlined. These activities should lead a student to understand or make sense of key concepts and principles by using key skills. In later chapters of this book, illustrations of differentiated lessons typically are based on specific concepts, principles, and skills that ensure this kind of clarity.

Where Do Standards Fit In?

In many districts, teachers feel great pressure to ensure that students attain standards delineated by the district, the state, or a professional group. Standards should be a vehicle to ensure that students learn more coherently, more deeply, more broadly, and more durably. Sadly, when teachers feel pressure to “cover” standards in isolation, and when the standards are presented in the form of fragmented and sterile lists, genuine learning is hobbled, not enriched.

Each standard in a prescribed list is either a fact, concept, principle, attitude, or skill. It is a valuable exercise for teachers, administrators, and curriculum specialists to examine standards lists, labeling each standard with its level of learning.

Some sets of standards are based on concepts and principles, integrating skills of the particular discipline into networks of understanding. That is the case with many of the standards developed by national professional groups. In other instances, however, standards reflect predominately skill-level learning, with an occasional attitude level, and less frequently a principle level. When this is the case, educators need to “fill in the blanks,” making certain that learning experiences are solidly based on concepts and principles and that students use skills in meaningful ways to achieve or act upon meaningful ideas.

This point hit home for me when I recently heard one educator telling another about a classroom she had visited. “I asked the child what the class was working on,” the educator reported. “She told me they were writing paragraphs, and I asked what they were writing about. She told me again they were writing paragraphs, and I smiled and asked, ‘But *why* are you writing the paragraphs?’

Levels of Learning	Science	Literature	History	Music	Math	Art	Reading
Facts	Water boils at 212° C Humans are mammals.	Katherine Paterson wrote <i>Bridge to Terebithia</i> . Definition of plot and definition of character.	The Boston Tea Party helped to provoke the American Revolution. The first 10 amendments to the U.S. Constitution are called the Bill of Rights.	Strauss was The Waltz King. Definition of clef.	Definition of numerator and denominator. Definition of prime numbers.	Monet was an Impressionist. Definition of primary colors.	Definition of vowel and consonant.
Concepts	Interdependence Classification	Voice Heroes and antiheroes	Revolution Power, authority, and governance	Tempo Jazz	Part and whole Number systems	Perspective Negative space	Main idea Context
Principles	All life forms are part of a food chain. Scientists classify animals according to patterns.	Authors use voices of characters as a way of sharing their own voices. Heroes are born of danger or uncertainty.	Revolutions are first evolutions. Liberty is constrained in all societies.	The tempo of a piece of music helps to set the mood. Jazz is both structured and improvisational.	Wholes are made up of parts. The parts of a number system are interdependent.	Objects can be viewed and represented from a variety of perspectives. Negative space helps spotlight essential elements in a composition.	Effective paragraphs generally present and support a main idea. Pictures and sentences often help us figure out words we don't know.
Attitudes	Conservation benefits our ecosystem. I am part of an important natural network.	Reading poetry is boring. Stories help me understand myself.	It's important to study history so we write the next chapters more wisely. Sometimes I am willing to give up some freedom to protect the welfare of others.	Music helps me to express emotion. I don't care for jazz.	Math is too hard. Math is a way of talking about lots of things in my world.	I prefer Realism to Impressionism. Art helps me to see the world better.	I am a good reader. It's hard to "read between the lines."
Skills	Creating a plan for an energy efficient school. Interpreting data about costs and benefits of recycling.	Using metaphorical language to establish personal voice. Linking heroes and antiheroes in literature with those of history and current life.	Constructing and supporting a position on an issue. Drawing conclusions based on analyses of sound resources.	Selecting a piece of music that conveys a particular emotion. Writing an original jazz composition.	Expressing parts and wholes in music and the stock market, with fractions and decimals. Showing relationships among elements.	Responding to a painting with both affective and cognitive awareness. Presenting realistic and impressionistic views of an object.	Locating main idea and supporting details in news articles. Interpreting themes in stories.

What are you trying to communicate?" She answered me with some irritation, "Oh, that doesn't matter. We're just writing paragraphs!"

Put another way, teaching skills without coherent, meaning-rich ideas is hollow. In addition, teaching mechanics without meaning is counter to the way humans learn (as was discussed in Chapter 3).

Learning Levels: A Case in Point

I once watched two 3rd grade teachers scramble to figure out how they could "cover" another unit in science before the year ended. They told me they had "moved too slowly." They still had to "do clouds" with students in the few remaining days of class.

The two teachers worked hard to lay out materials from science books, which they would have their students read. They found some stories about clouds that students usually liked, hoping they'd have time to read them. The two teachers agreed on cloud worksheets the students could complete, and they chose an art activity the students would enjoy. All this work seemed very urgent and purposeful. Yet as the two began to decide the order in which they'd use the materials, one teacher discovered she had forgotten the name of one kind of cloud. The second teacher realized she recalled the names, but she couldn't match the names to any pictures. Both teachers had "taught the cloud unit" several times.

This example of "planning a unit" is common. With good intent, teachers try to do what their program of study outlines. In this case, the outline said students should know and recognize the kinds of clouds. While the curriculum guide may state how this segment of study fits into a larger

framework of understandings and skills, the guide did not make that explicit to the teachers who, in turn, would not make it explicit to their students. Thus, the "unit" these teachers prepared was largely fact-based and devoid of concepts, principles, and skills. Not surprisingly, even the teachers who had taught the unit for several years had difficulty recalling the facts. This did not portend rich, long-term outcomes for the students!

By contrast, another teacher mapped out her whole year in science around four key concepts: change, patterns, systems, and interrelationships. All year, students examined a range of scientific phenomena, learning how they illustrated the four concepts. At the outset of each exploration, the teacher developed essential principles she wanted all students to come to understand through their study. Some of the principles were repeated in several units. (For example: Natural and human made things change over time. Change in one part of a system affects other parts of the system. We can use patterns to make intelligent predictions.) Some generalizations were specific to a particular study. (For example: Water can change in form. Living things are part of ecosystems.)

The teacher also created a list of skills students were to master in the course of the year. For example, her students needed to learn to use particular weather tools, to make predictions based on observations rather than guesses, and to communicate data through pictures and written statements. The teacher chose appropriate places in the various studies to have students use the skills to understand key principles. Facts were everywhere as students talked about specific events just as scientists would.

At one point in the year, students used weather instruments (skills) to talk about patterns and

interrelationships in weather systems (concepts). They explored two principles: (1) that change in one part of a system affects other parts of the system and (2) we can use patterns to make intelligent predictions. Then they predicted (skill) what sorts of clouds (facts) would be likely to form as a result of the patterns and interrelationships they saw. They illustrated and wrote about their predictions using appropriate cloud terminology. They then observed what happened, assessed the accuracy of their predictions, and communicated their observations in the form of revised drawings and explanations.

This kind of planning for student learning creates a structure for coherent understanding all year. Facts illustrate and cement key ideas that are rediscovered repeatedly. Skills have a purpose rooted in meaning and utility. The learning promotes both engagement and understanding. These students are more likely to understand how their world works and to feel more competent as learners and young scientists. They also are more likely to remember the names and nature of clouds a year or two down the road—and so is their teacher!

Curriculum Elements

To ensure effective teaching and learning, remember that teachers need to link tightly three key elements of curriculum: content, process, and product. (The other two elements of curriculum are learning environment and affect. Those elements were introduced in Chapter 3, and they must consistently remain central to thinking about, planning for, observing, and assessing instruction.)

Content is what a student should come to know (facts), understand (concepts and principles), and

be able to do (skills) as a result of a given segment of study (a lesson, a learning experience, a unit). Content is “input.” It encompasses the means by which students will become acquainted with information (through textbooks, supplementary readings, videos, field trips, speakers, demonstrations, lectures, or computer programs).

Process is the opportunity for students to make sense of the content. If we only tell students something and then ask them to tell it back to us, they are highly unlikely to incorporate it into their frameworks of understanding. The information and ideas will belong to someone else (teacher, textbook writer, speaker). Students must process the ideas to own them. In the classroom, process typically takes place in the form of activities. An activity is likely to be effective if it

- has a clearly defined instructional purpose,
- focuses students squarely on one key understanding,
- causes students to use a key skill to work with key ideas,
- ensures that students will have to understand (not just repeat) the idea,
- helps students relate new understandings and skills to previous ones, and
- matches the student’s level of readiness.

A product is a vehicle through which a student shows (and extends) what he or she has come to understand and can do as a result of a considerable segment of learning (such as a month-long study of mythology, a unit on weather systems, a marking period spent on studying governments, a semester learning to speak French, or a year spent investigating ecosystems). The examples in this book use the term “product” to mean “culminating product,” or something students produce to exhibit major portions of learning. It is not used to talk

about pieces of work students produce during the course of a day. For the purposes of this book, those short-term creations simply are concrete and visible elements of an activity.

A culminating product might take the form of a demonstration or exhibition. Students could design a solution to a complex problem or undertake major research and writing. A culminating product could be a test, or it could be a visual display, such as a narrated photo essay.

An effective assignment for a culminating product will:

- Clearly lay out what students should demonstrate, transfer, or apply to show what they understand and can do as a result of the study.
- Provide one or more modes of expression.
- Lay out clear, precise expectations for high-quality content (information, ideas, concepts, research sources); steps and behaviors of developing the product (planning, effective use of time, goal setting, originality, insight, editing); and the nature of the product itself (size, audience, construction, durability, format, delivery, mechanical accuracy).
- Provide support and scaffolding for high-quality student success. (For example, provide opportunities to brainstorm ideas, delineate rubrics, and establish time lines. Conduct in-class workshops on use of research materials, or provide opportunities for peer critiques and peer editing.)
- Provide for variations in student readiness, interest, and learning profile.

Joining Learning Levels and Curriculum

A top-rate teacher is clear about all levels of learning in whatever unit or segment she is exploring with her students. She then makes certain that

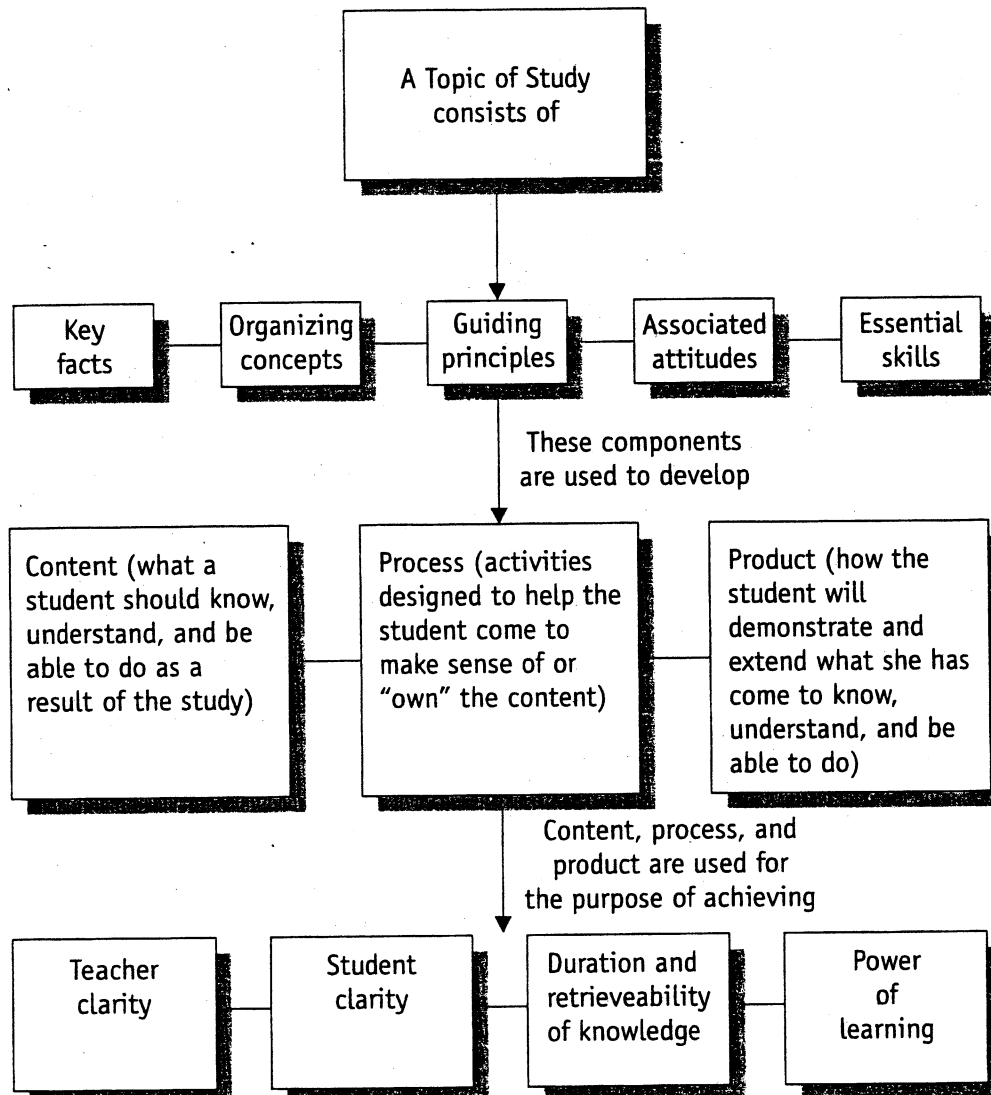
content, process, and product are built around materials and experiences that lead students to engage with and genuinely understand the subject. That means content, process, and product are squarely focused on exploring and mastering key concepts, essential principles, related skills, and necessary facts (see Figure 5.2). The following example illustrates how this sort of thinking and planning might look.

Ms. Johnson and her middle schoolers are beginning a study of mythology. The concepts she and her students will explore in this study (and throughout the year) include hero, voice, culture, and identity. Among the principles they will investigate are the following:

- People tell stories to clarify their beliefs for themselves and for others.
- Our stories reflect our culture.
- Understanding someone else's view of the world helps us clarify our own view.
- When we compare the unfamiliar with the familiar, we understand both better.
- Who a person, or culture, designates as hero tells much about the person or culture.
- Myths are mirrors of values, religion, family, community, science, and reasoning.

Among skills that will be emphasized in the month-long study: paragraphing, punctuating dialogue, comparison and contrast, and interpreting and using similes and metaphors. As is the case throughout the year, the teacher makes certain students use the vocabulary of fiction (plot, setting, protagonist, theme, tone) as they talk about and work with the myths. She also ensures that students encounter characters and events (facts) from key myths often and in various contexts. This way they become familiar with important names and events that contribute to the vocabulary,

Figure 5.2
Joining Levels of Learning and Elements of Curriculum



symbols, and allusions throughout their own and other cultures.

Knowing the key facts, concepts, and principles she intends her students to learn directs Ms. Johnson's selection of myths (content). She knows, for example, that she must select myths that reflect several cultures; include clear exemplars of heroes; reveal views about religion, community, and science; and introduce events and characters that are the basis for oft-used cultural symbols and allusions.

Ms. Johnson develops core activities that help students link what they read and talk about from the myths with their own cultures, beliefs, and ways of thinking. Further, she develops activities so students must use targeted skills to complete them, and she directly teaches the skills as the students need them. For example, she and the students will decide what makes a hero in Greek, Norse, and African myths. She's considering having students write, and perhaps present, a conversation between a mythological hero and a contemporary hero. She'll ask the students to do this in a way that lets the audience compare and contrast the heroes' cultures and beliefs. To do this, students will have to know important characters and events, understand the concept of hero, apply the principles they've been studying, and use the skill of punctuating dialogue.

When she develops an assignment for a culminating product, Ms. Johnson offers several options. However, all the options require students to

- demonstrate their understanding of myths as mirrors of hero and culture;
- use core knowledge about important characters and events from important myths; and
- use the targeted skills of metaphorical thought and language, punctuation of dialogue, and comparison and contrast.

Ms. Johnson's clarity about what students must know, understand, and be able to do as a result of a unit promotes engagement. Students see ancient myths as very much like their own lives. The myths make sense, seem real, and connect to things they feel are important. The myths promote understanding because they link new knowledge and insight with the familiar.

Ms. Johnson's activities help students build frameworks to organize and think about knowledge and ideas. They provide reinforcing and connective learning opportunities through all elements of the curriculum. Ms. Johnson has not yet started to think about differentiating instruction for varied student readiness, interest, and learning profile. However, she is laying the foundation for doing so in a rich and meaningful way.

For More Information

For additional information about concept-based teaching and alignment with learning standards see the following resource.

Erikson, H. (1998). *Concept-based curriculum and instruction: Teaching beyond the facts*. Thousand Oaks, CA: Corwin.